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APRIL 1959

Metlfax

Magazine

- PEOPLE
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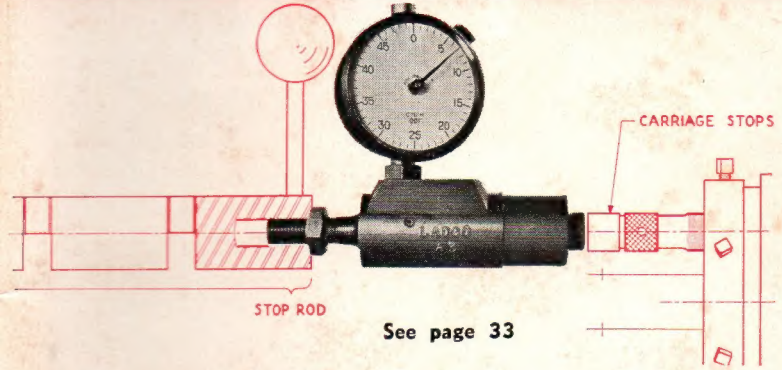


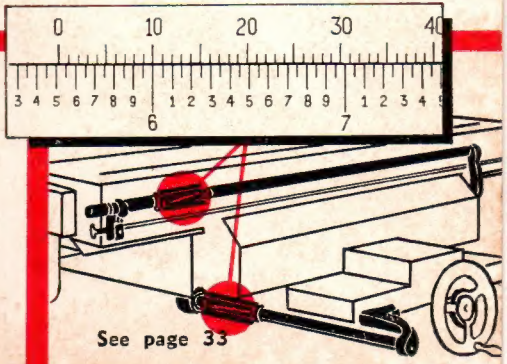
See page 33

Numerical Control . . .

Machining Guide . . . .

Depreciation . . . . . .

—all in this issue



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(0.000006″ at 10″ diameter)

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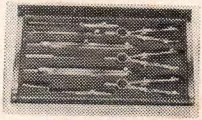

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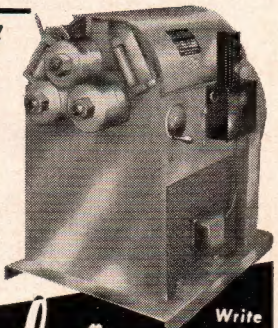

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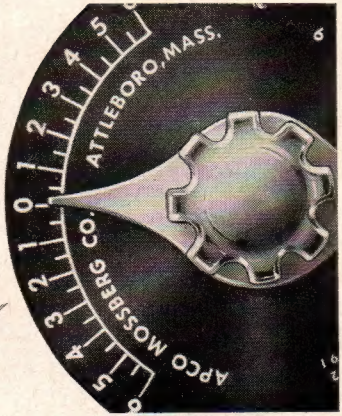

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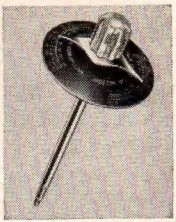

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Any spring made fast in your shop!

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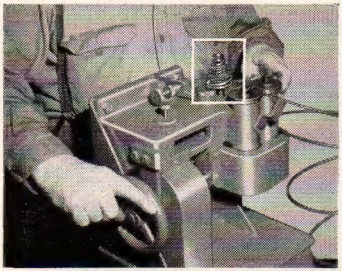

left or right hand, in any desired length, any diameter from 3/32″ to 12″ and larger, with or without initial tension, and with open or closed ends. Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications as replacements or experimental work. Make them fast, right in your own shop!

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Please send information and prices on Perkins Spring Coiler.
Hand Model ☐ Power Model ☐

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Company.....
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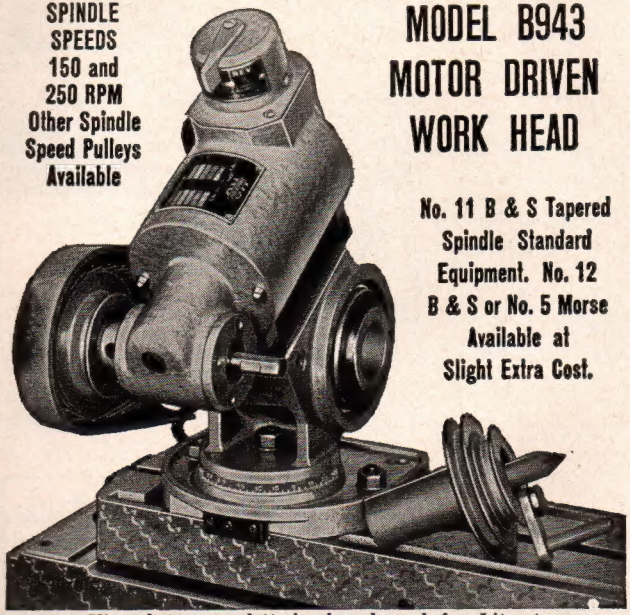
ACCURACY .0002 T.I.R.

.0002 T.I.R. or less at Spindle Nose, .0005 T.I.R. or less on Test Arbor six inches from Spindle Nose

SPINDLE SPEEDS 150 and 250 RPM Other Spindle Speed Pulleys Available

MODEL B943 MOTOR DRIVEN WORK HEAD



No. 11 B & S Tapered Spindle Standard Equipment. No. 12 B & S or No. 5 Morse Available at Slight Extra Cost.

Clip ad to your letterhead and send for Literature

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NO HAND DRAINING

Extracts and vaporizes all air line moisture and grit, prevents costly rust and abrasion of valuable tools. Combines with pressure regulator and automatic lubricator for complete protection of air-operated equipment.

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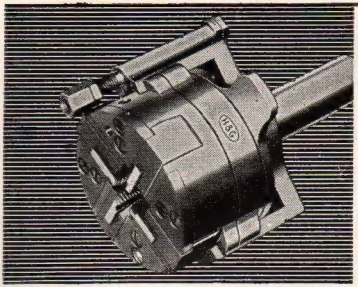

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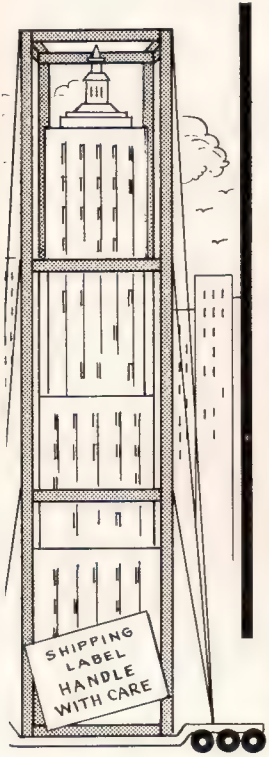

So you're NOT in the moving business. You may still have a towering problem . . . how to build storage racks or platforms from a material that won't leave any waste. You don't want to drill or weld or paint. You have unskilled labor to build it.

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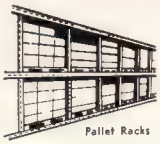
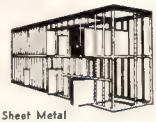

Pallet Racks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Tool shank diameter capacity 0" to 1½".

Adjustable bearings for take-up wear.

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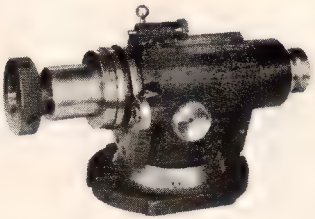
Make rigid comparison of this tool for features and price.



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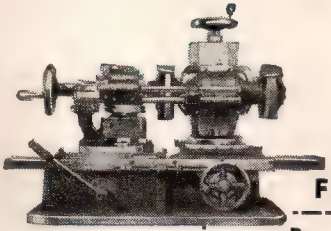

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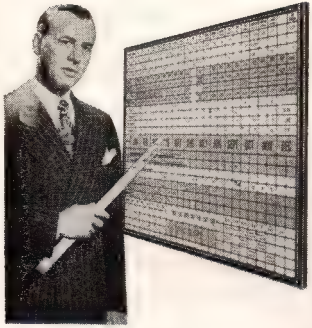

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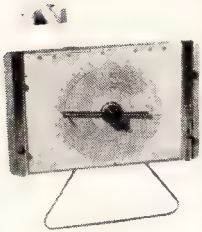

Gage men — this is a perfect device to check hand torque wrenches, power wrenches, stall torque of any kind. Records your test. Less than ½ of 1% error guaranteed.

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A pneumatic power wrench to run and torque small screws up to 48 ounce inches. Fast, reliable and very accurate. Weighs only 13 ounces. Also larger tools.

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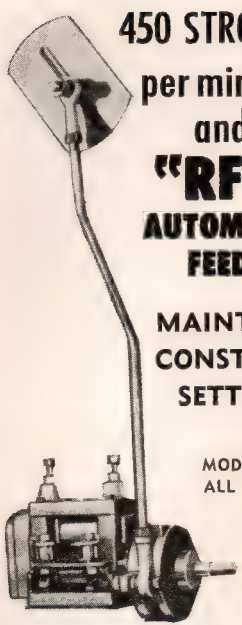
MAINTAIN CONSTANT SETTINGS

MODELS FOR ALL PRESSES



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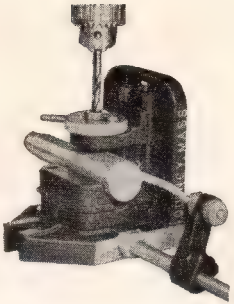

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Eliminates Layout; Cuts Drilling Time

Used for drilling holes through round stock and hex stock from 1/4" to 2" and cap screws from 1/4" to 1-1/4", the new Mathewson Adjustable Drill Jig eliminates layout and can cut drilling time on small lots to a fraction. And it eliminates the costs of special jigs for larger quantities. ● Holes for cotter pins, set screws, drive pins for bayonet joints, oil holes in tubular sections, and wiring holes in cap screws, are all typical of the operations that can be done more economically with this jig. Hole diameters range from .052" to .531", using your A.S.A. standard slip bushings. ● The hardened V-block has two 60-degree V's for centering round or hexagonal stock, one for 1/4" to 21/32" diameter, one for 21/32" to 2" diameter. Adjustable stop for locating work longitudinally for drilling any distance from end, may be used on either side. Adjustable bushing carriers hold slip bushings and clamp work securely. ● Jig highly successful in permitting use of inexperienced operators. For circular write to: **Mathewson Machine Works, 84 Hancock St., Quincy 71, Mass.**

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Low-Cost Flexible Stackbin System Saves Space, Time and Labor

Stackbin®-Stackrack® Combinations are the ideal way to minimize parts, tools, materials handling. Stackbins are portable containers, so you can carry materials throughout your process without transferring contents to any other container. Stored in Stackracks, every Stackbin is instantly accessible *when it's needed.* You never disturb another bin. Hopper fronts on Stackbins provide visibility and accessibility to the materials. Available in 7 sizes, Stackbin-Stackrack Combinations make most efficient use of floor space. With inexpensive Adapters any small units can be stacked on larger units. Related items can be kept in one place. Individual units lock together: no tools, no setup time needed.

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Mfgd. and sold in Canada exclusively by Wickware-Stackbin, Ltd., Perth

STACKBIN® SYSTEM

"Stacked and Still Accessible"

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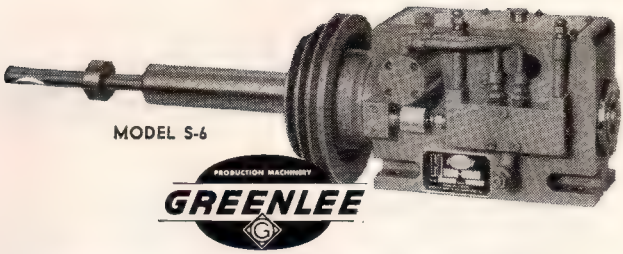
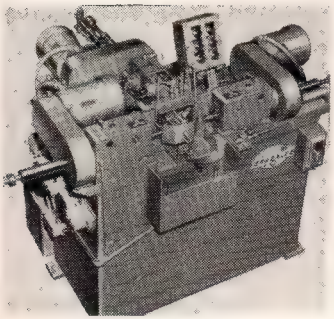


HYDRO - BORER UNIT

Lowers your costs on precision boring



In the special application shown at the left, aluminum die castings are precision bored by three Greenlee S-6 Hydro-Borers mounted on a welded steel base. Greenlee can help you reduce your boring costs. Write for further information.

PRODUCTION MACHINERY
GREENLEE

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Rockford, Illinois

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DYE PENETRANT INSPECTION

finds cracks quick

Spray-on cleaner-dye remover—removes grease, dirt, foreign matter—wipe off excess with cloth.

Spray-on penetrant—allow short time for penetration—wipe off excess with cloth.

Spray-on developer—Inspect. Cracks, pores, defects open to surface appear as red lines in white developer area. That's all there is to it!

All materials are available in Fire-Safe new formulas, in spray cans or in bulk up to 55 gallon drums.

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Everything you need in handy, rugged steel carrying case. 2 spray cans Penetrant, 2 spray cans Developer, 4 spray cans Cleaner-Dye Remover, instruction book, cleaning cloth, wire brush.

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WITH THE NEW
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Being equipped with SEIBERT *Magic* Chucks is like having spindles added to your single-spindle drill press. With these chucks a sequence of operations is quickly performed, because of the ease and speed of changing the quick-change collets. It works just like magic! Lift the locking ring to remove the collet. Insert a new one with its tool and drop the ring back down on the chuck to lock the collet in place. Made in six sizes, with a wide selection of collets (specials and blanks, too), this new tool is an important addition to the SEIBERT line of fine holding tools.

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From the Notebook

A process that increases the affinity of carbide blanks for brazing has been developed by National Twist Drill Co., who is willing to let carbide fabricators and manufacturers try it themselves. "Brazeez" makes brazing easier and faster and eliminates the blast cleaning usually required. It's basically a cobalt film.

A frosted stainless steel finish has made its debut under the name "Fro-Zon." A type of "semi-blasting" that doesn't penetrate the metal's surface does it, says Stamping Service, Inc. The Detroit firm's also working on a stainless steel coloring technique.

Cold compacting, followed by upsetting, is best for fabricating beryllium, Air Force research shows. It yields the best material.

Shop committees cost from $700 per man per year to many thousands, reports Associated Industries of Cleveland. Many companies, in their attempts to cut present costs, are forgetting that most such committees and committee policies were assembled in boom times. They can and should be re-examined now in terms of present employment.

"Ball bonding" is what Twin Coach Co. calls its highly successful adhesive bonding technique for joining irregularly shaped aircraft parts without voids between pieces. Aluminum balls apply pressure uniformly during bonding. The company has applied for a patent on the technique. They believe it can be adapted also to brazing.

Preparing for the Space Age, The Martin Co. has launched a "task force" approach to missile and aircraft

engineering. Two new groups—Manned vehicles and Missiles-Electronics—replace the former single engineering organization there.

A "packaged" lease plan that groups combinations of equipment for leasing, rather than by individual item, is now available from Nationwide Leasing Co.

Radically designed carbide tools with extreme rakes and angles are matching the cutting speeds of ceramics, on conventional machines, in shaping nuclear materials, reports K. R. Fisher, president of Super Tool Co. While short on details, Fisher does tell us that the carbides used are new, formulated to cope with materials harder than the hardest alloy steels.

All the tiny precision screw machine parts made by Woodside Screw Machine Co. now get an ultrasonic "dunking" to remove dirt, grease, and burrs. The bath's important since the gears, pinions, etc. are used for many extremely sensitive controls. Ultrasonics makes the job easier, more economical.

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Combines slide-hammer and drift in one easy to use tool. Leaves one hand free to hold drill from dropping. Heavy handle strikes with sufficient force to remove the most stubborn drill, has spring return. Automatic, convenient, effective. 4 sizes.

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MARSHALL STEEL COMPANY
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ELGIN NATIONAL WATCH COMPANY

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Metlfax Magazine
Vol. 3, No. 6 April 1959

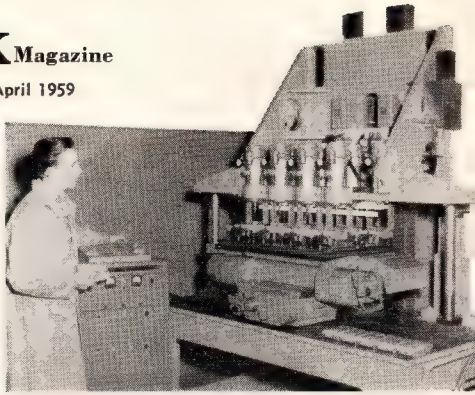


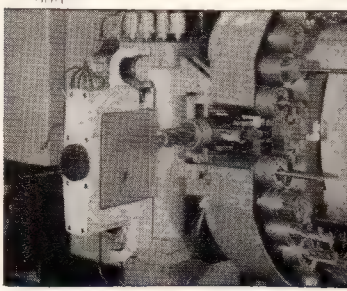
Fig. 1. Micro-Path controlled special machine, with Dumore drill heads, for making check cancelling dies.

More Interesting Variety in

New Numerical Control Units

NUMERICAL CONTROL in many sizes, forms, and degrees of sophistication is continuing to make news. The recent developments in the field should, in some way, interest every machine tool user. The time, labor, and money-saving features of N-C are a part of each one. The way these features are designed into the equipment is somewhat different in each case.

Fig. 2. Tool change arm and selected toolholder in transfer position in Kearney & Tercker unit.



In the relatively inexpensive (for numerical control) small scale range is the Micro-Path system (Fig. 1), that records complicated continuous path or point-to-point machine tool movements on magnetic tape without using computers to supply special

Fig. 3. G & L vertical turret lathe with continuous path numerical control for machining oil field valves at Gray Tool Co.

data. The machine tool to which the control equipment is attached can serve as the programmer, with positioning information "traced" from templates or models, or supplied from rough drawings and size specifications.

Also new in the N-C picture is Kearney & Trecker's automatic tool changing feature (Fig. 2) on their Milwaukee-Matic. K&T built automatic tool changing into a N-C line for Hughes Aircraft a year ago. Now, however, they've refined their system to cut both complexity and cost. The Hughes setup needed a separate spindle for each tool in the storage magazine. The new unit doesn't, which in itself cuts costs considerably. The new combination machine, with General Electric numerical controls, performs milling, drilling, reaming, tapping, and boring operations automatically. Thirty-one combinations of tools can be loaded into the tool-changer magazine.

Techniques perfected by Giddings & Lewis Machine Tool Co. now put numerical control equipment on big vertical turret lathes (Fig. 3), exercising control over feeds, speeds, indexing, and many other functions. The first VTL is destined for Gray Tool Co., where it'll be the first application of magnetic tape control outside the aircraft industry.

Depreciation Important

as source of business funds

IN THE MIDST of loud cries for more flexible depreciation schedules in income tax laws, figures released by The First National Bank of Chicago show that depreciation charges under present laws have become more important than retained earnings as a source of funds to corporations. It is reasonable to believe, after studying their data, that more money for new equipment is available now than plant managers may realize.

Since the end of World War II, the Bank's *Review* reports, depreciation—the recovery of the costs of plant and equipment by deductions from income—has come to be the most important single source of funds to corporations. In 1946, depreciation charges totaled $4.2-billion, or 19% of all funds available to corporations for purchase of additional plant, equipment, and other assets. By 1957, these had increased 369% to $19.7-billion, or 49% of total available funds.

Since 1946, they add, depreciation as a source of funds has increased at a much faster pace than net earnings after dividends. In 1946, retained earnings were almost twice as large as depreciation charges, but in 1957 the opposite was true.

A significant factor in the growth of these charges, they say, is the large increase in the value of plant and equipment. "In 1957 these assets were estimated at $360-billion, or more than 2½ times the amount at the end of World War II. In addition to the increase in the total value of assets upon which depreciation is determined, business since the end of the war has purchased more equipment than buildings. Because most pieces of equipment have much shorter useful lives than buildings, the average life of the total amount of depreciable assets has been shortened and annual de-

preciation charges have been increased.

"Statutory changes in Internal Revenue regulations in 1950 and 1954," the bank continues, "also added to the growth in depreciation totals in this period. In 1950, corporations were permitted to recover costs of assets acquired principally for defense purposes at a faster rate, and beginning in 1954 managements were allowed several methods of calculating depreciation which permit greater recovery of original costs of new plant and equipment in the earlier years of their use." The impact of the 1950 law, they believe, is currently of declining importance as more and more assets covered by this regulation become fully depreciated. "On the other hand, the significance of the 1954 law is growing as the volume of depreciable assets covered by the new regulation rises."

Summing up, it may be worth management's while to look into its accounting methods to see if it is gaining all of the possible benefits of the 1954 law. Perhaps the dollars needed for modern equipment are more feasibly and readily available than they anticipated.

DON'T OVERLOOK POWER BRUSHING

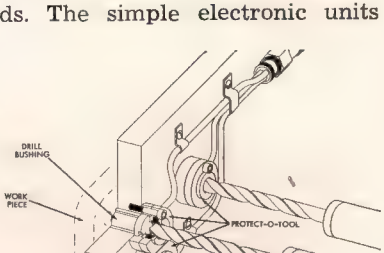
THERE ARE BRUSHES, and there are brushes . . . the kind that can save 93% of metal removing time! The latter type, as demonstrated at Cleveland's Osborne Manufacturing Co., are extremely effective for removing burrs, breaking edges, and blending surfaces. They can remove metal by volume, yet their touch can be delicate enough to give a 5 to 20 micro-inch finish.

A machine there, for example, deburrs large missile parts uniformly in 2 min. Hand deburring, with expected variations in quality due to human variables, took half an hour.

For power brushing, the part is loaded onto a rotating table. Three heads reciprocate in and out with their variously shaped brushes to remove metal where necessary. Everything is automatic; even the brushing compound is automatically applied at proper intervals.

Find Bad Tools Fast

THERE'S NO NEED TO build separate probe and inspection heads or stations into transfer-type machining lines now that Cross Co.'s Protect-O-Tool units are off the drawing boards. The simple electronic units sense the presence or absence of a tool (or part of a tool) and shut down the line when one is detected. This prevents additional tool damage and production of scrap parts—partially and incorrectly machined workpieces—in succeeding stations.



Mounting, too, is simple, as shown. The units are attached to the bushing plate over the drill bushing with a single bolt. They're quickly removable for drill bushing replacement.

How Much Quicker

QUICK-CHANGE TOOLHOLDERS "sound" quicker, and upon examination "look" quicker, but how much tool changing time do they save? A project report from the Cooperative Machining Project (Comapro), headquartered at Cone Automatic Machine Co.'s plant, shows quick-change toolholder (Scully-Jones) tool changing time as 8½ min, while conventional holder tool changing took 62 min, 50 sec. The toolholder findings were incidental to tests made to find the best way to produce spark plug shells. Eleven different tools and operations on an Automatic were involved, including form, shaving, marking, knurling, and cut-off tools, drills, and a reamer.

Photo Form Tiny Parts

THE ELECTRONICS INDUSTRY, especially, uses parts so small, thin, and complicated, and of such unusual materials, that ordinary fabricating processes are ineffective. Such is the reason for the increasing interest in photo forming, a process whereby an acid-resisting photographic image is printed on sheets of metal and the unexposed portion etched away.

The process has made commercial fabrication of tiny molybdenum parts possible, and should soon become just as effective for tungsten and tantalum, reports Fansteel Metallurgical Corp. Two firms now supply photo formed polybdenum parts, Buckbee Mears Co. and Superior Tube Co.

Tooling for the process, says Fansteel, is merely a well-made oversize mechanical drawing that's reduced to size photographically. The oversize-reduction combination assures accuracy. Metal thickness, at the present time, should be 0.001" to 0.005" thick, although in some cases 0.010" thick material is used. Minimum hole size shouldn't be smaller than the thickness of the sheet being fabricated. Forming and spot welding are possible after the etching process.

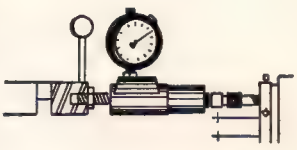
OPTIMISM AND NEW ORDERS

A LARGE MAJORITY of the executives interviewed in Dun & Bradstreet's most recent compilation of business operations are optimistic in looking at their second quarter sales and profit prospects. Sales will be higher than a year ago, said 77%, while 20% forsee no change and only 3% think sales will be below last year's.

* * * *

FORTY-MILLION DOLLARS worth of new sales were written on machine tool builders' books in January. This is down from the $43-million of December, but the first time in months that sales stayed at the 40-million level. A good sign: Cancellations in January amounted to only $750,000, while December's totaled more than $2-million.

Gage Boosts Lathe Accuracy



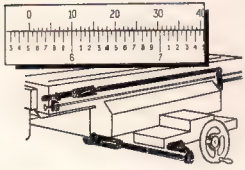
(from the cover)

THE LADCO STOP GAGE for turret lathes makes it possible to hold closely dimensions that require accurate longitudinal positioning of tooling on the cross-slide. It's easily installed, with gage screwed directly into the stop rod, and doesn't interfere with normal lathe operation.

A spring in the unit disengages the longitudinal feed of the universal carriage without actuating the dial indicator. The indicator is protected from damage if the carriage is bumped into the stop rod because the spring retainer comes into solid contact with the gage stop at the end of the allowed travel. Stop "takes up" 0.040" travel, maintains 0.0005" tolerances.

Get specs from Lad Gage Co., Box A, Geauga Lake, Ohio, or circle 331 on the Metlfax cover card.

Direct Reading Machine Verniers



(from the cover)

PROBLEMS DUE TO BACKLASH, lead screw wear, and miscount of turns are eliminated by the direct-reading Evertrue vernier scales, which may be mounted easily on any precision machine tool and moved from machine to machine. A portion of the easy-to-read scale is shown "to size" on the cover. Graduations are SIP engraved and permanently guaranteed for accuracy.

Unlike lead screws, these scales do not depend on rubbing or mating surfaces, so wear can't destroy accuracy. Installation is simple. Scales are rotatable for easier reading and protection of faces. For details, contact Edgcomb Engineering & Engraving Co., 1105 N. Hollywood Way, Burbank, Calif., or circle 332.

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4 standard UNIPUNCH Units including 43 grad and 86 die buttons.
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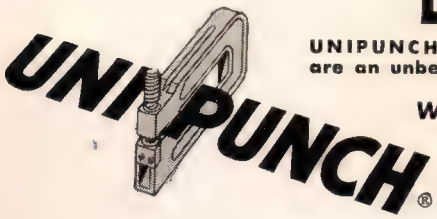

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This ALL NEW 10 TON UNIPUNCH PRESS with UNIPUNCH TOOLING punches holes in sheets, angles, channels and extrusions plus notching operations . . . more economically and more efficiently.

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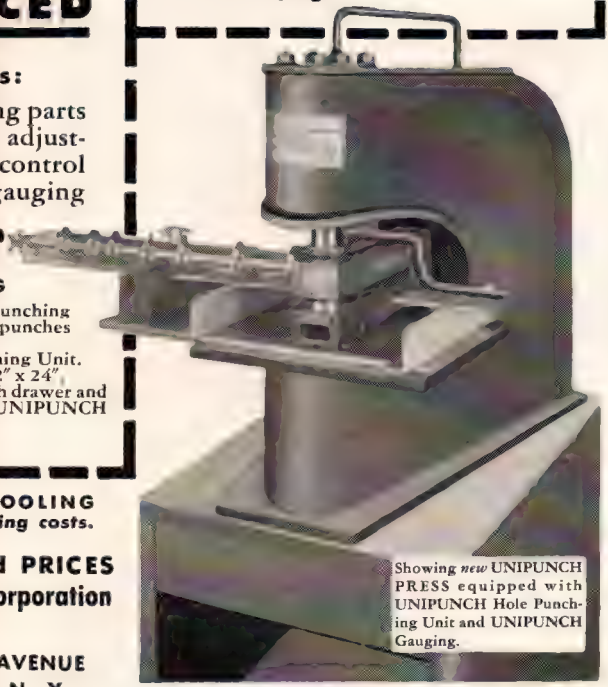

Showing *new* UNIPUNCH PRESS equipped with UNIPUNCH Hole Punching Unit and UNIPUNCH Gauging.

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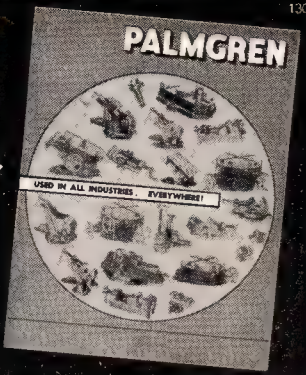
ON WORK HOLDING TOOLS FOR PRODUCTION, TOOLING, MAINTENANCE



Drill press vises, angle vises, swivel machine vises, rotary tables, lathe milling attachments, production vises, heavy duty angle vises, and adjustable angle plates are illustrated and fully described in the New Palmgren Catalog. This is the only complete line of work holding devices available anywhere. Designed for production, tooling, and maintenance work, there are 68 different models and types to choose from. Vise jaw sizes are from 1½" to 8". Ask for your copy of this FREE Catalog No. 205 today. The complete line with details and prices are shown.

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Lathes Turning Scrap?

VIBRATION, CHATTER, and similar "ills" can raise havoc with lathes and workpieces alike. Correction is simplified if diagnosis is systematized. The following lathe trouble-shooting chart, compiled by LeBlond Machine Tool Co., helps pin-point trouble-spots and speed correction of them.

CAUSE	REMEDY
Vibration	
Loose leveling screws.	Set all screws so they bear evenly on leveling plates.
Torn or mismatched v-belts.	Renew v-belts with matched set.
Work or chuck out of balance operating at high spindle speeds.	Balance chuck or reduce spindle speed.
Motor out of balance. (Check by taking off drive belts and running lathe from a motor mounted on floor.)	Contact local representative of motor manufacturer.
Chatter	
Cutter bit improperly ground or too wide an area of contact.	Regrind cutter bit or adjust toolholder so that area of contact between tool bit and work is decreased.
Tool overhang too great.	Keep point of cutter bit as close as possible to toolholder.
Using improper surface feed.	Reduce or increase spindle speed.
Feed rate too high.	Reduce feed.
Gibs of cross-slide or compound rest loose.	Adjust gibs.
Work improperly supported.	Adjust tailstock center. Use steady rest or follow rest on long slender shafts.
Vibration.	See "vibration" section.
Spindle bearing loose.	Adjust spindle bearings.

—more on page 39

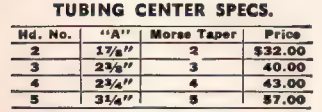
LIVE CENTERS

LIVE CENTERS

Head No.	Morse Taper	Price
2	2	$28.00
3	3	32.50
4	4	40.00
5	5	52.00
6	6	75.00
7	7	265.00

TUBING CENTER SPECS.

Hd. No.	"A"	Morse Taper	Price
2	1⅞"	2	$32.00
3	2⅜"	3	40.00
4	2¾"	4	43.00
5	3¼"	5	57.00



STRAIGHT SHANK CENTERS

Hd. No.	Shank Size	Price
3	1"	$40.00
4	1½"	53.00
5	1¾"	65.00
5	2"	75.00
6	2½"	85.00

Head of any other size and shape can be furnished to specs. Standard shanks made with Morse tapers, other tapers special, always specify Head and Taper —4-page catalog on request.

STURDIMATIC TOOL CO.
3950 F St., DETROIT 16, MICH.
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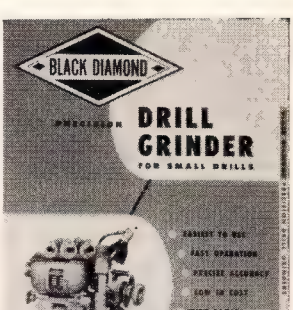

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This illustrated 4-page booklet shows you the fastest, easiest way ever developed to keep your costly drills sharp . . . and keep the savings — shows how anyone in your plant can restore dull drills to like-new sharpness in just 10 seconds with the Black Diamond Drill Grinder.* If your time, your money, and your drill costs are worth saving, send for this free booklet today.

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*Black Diamond Saw & Machine Works, Inc. Natick, Mass.—Manufacturers of Black Diamond and Worcester Drill Grinders.
Black Diamond Drill Grinder: #70 drills up to ¾"
Worcester Drill Grinder: ⅛" drills up to 2½"

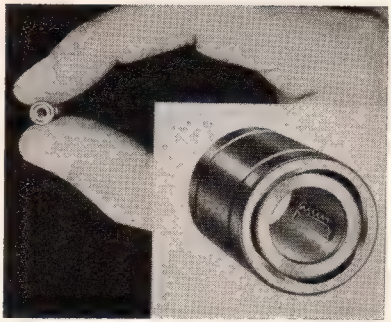
For data, circle No. 382 on cover

Work Not Turned Straight	
Headstock and tailstock centers not aligned.	Align tailstock center.
Work improperly supported.	Use steady rest or follow rest. Reduce overhang from chuck.
Bed not level.	Relevel bed, using precision level.
Tool not on center when using taper attachment.	Put tool on center.
Work Out Of Round	
Work loose between centers or centers are excessively worn—work centers out of round.	Adjust tailstock center. Regrind centers. Lap work centers.

Cross-slide Or Compound Rest Movement Does Not Coincide With Dial Movement or Respective Adjusting Screw.

Gib setting too tight or too loose.	Adjust gibs.
Work is too long and slender.	Use steady rest or follow rest.

SMALL ENOUGH FOR YOU? THEY WORK!



MILITARY DEMAND FOR MINIATURIZATION has resulted in development of techniques to produce tiny linear ball bearings, such as those pictured, with 0.3125″ OD's. A 16:1 pantograph ratio for milling makes their manufacture possible, says Thomson Industries, Inc. Despite the small size, each bearing contains three complete ball circuits — and each circuit 16 or 17 balls, depending on which of the two finished sizes is considered.

MATERIALS of Manufacturing

STRENGTH AT HIGH TEMPERATURES is a "must" for space vehicles and many strictly "civilian" products, too. Among the many recently introduced metals are a number with this property, including Latrobe Steel's new *Dynaflex*, an *air-hardening steel* that's able to resist softening upon continued exposure to temperatures up to 1000°F. It's tough and ductile at the 300,000 psi level and is relatively easy to form, has good weldability and relatively low coefficient of thermal expansion, better than average corrosion and oxidation resistance, and low strategic alloy content.

Westinghouse Electric's contribution to the high temp material scene is one to be used in a stream turbine slated for operation this year. The *material withstands pressures of 5000 psi and temperatures up to 1200°F.* ... Armour Research Foundation's, a series of *vanadium alloys* that offer *extreme workability, strength, and weldability.* The Armour alloys retain their strength at temperatures of 1200-1500°F.

From the Bureau of Mines comes word of the *first successful casting of molybdenum.* Although the first one was rather simple in design, they have high hopes of improving the techniques and also the intricacy of cast parts. Molybdenum's properties make it a natural for space and missile use, when and if it can be formed. The B of M development is a step in the right direction.

Getting closer to earth, General Motors' researchers have come up with experimental *steel-like material* that may, they say, offer engineers a replacement for plain steel forgings and permits more flexibility in the design of castings. Their *Centra-Steel* has high elastic modulus, strength equal to steel's, and better machinability than steel. It doesn't require extensive heat treatment.... *Bearing aluminum bars,* which can be machined to fit any bearing use, are now available from Bunting Brass & Bronze Co.

Pick Up In Pearlitic

PEARLITIC MALLEABLE IRON'S performance and cost are two big reasons why the metal has enjoyed a 480% increase in use in the past 10 years, with even bigger gains anticipated for this year. This figure, compiled by the Malleable Founders Society, is especially reasonable when some of the material's properties and characteristics are reviewed.

Malleable iron castings machine better than other iron products of equal yield and tensile strength, and even if a little higher in cost initially, they rate high with cost-conscious designers. In comparison with forgings of the same hardness, malleable iron is often cheaper.

They respond to localized hardening, either flame or induction; their hardenability is similar to low alloy steel, and in small sections suitable for full hardness when oil quenched; they offer good wear resistance and are easy to form by a number of operations unusuable with other types of iron castings.

Use of pearlitic malleable iron now accounts for approximately 20% of all malleable production. Another 18% increase is predicted for this year. To handle the supply, malleable founders are scheduling over $6-million worth of capital improvements in 1959.

. . . Worth Having

"The Cooling Characteristics of Cutting Fluids at High Speeds," by Shaw, Cook, and Smith (MIT). Research Report #19, American Society of Tool Engineers, Detroit 38 ($.75 to members; $1.50, non-members).

"Cobalt," a new quarterly review published by the Cobalt Information Center, c/o Battelle Memorial Institute, Columbus 1, Ohio (free).

"The Accuracy and Geometry of Precision Surface Plates, Angles, and Straight Edges," by E. Willard Pennington. Huebner Publications, Inc., 1975 Lee Rd., Cleveland 18 ($.75).

"How to Make Your Own Machine and Repair Parts Quicker and Easier." LaSalle Steel Co., P. O. Box 6800-A, Chicago 80, Ill. (free).

NAMES IN THE NEWS!

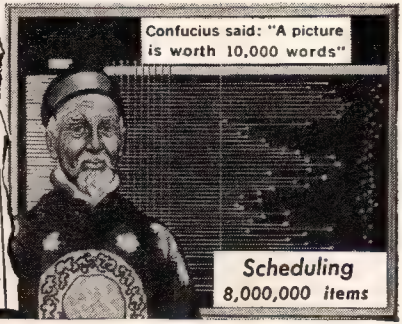
Jupiter! Redstone!

Missile Development Centers are among the largest Government Defense users of Produc-Trol for research, production, manpower and other types of scheduling.

PRODUC-TROL Visual Control

not only schedules,

But automatically checks with TIME, LINE and COLOR control



- Original cost and upkeep low.
- Schedules and time checks operations.
- Historical record to back it up.
- Bad situations show automatically.
- Its simplicity has put it into world-wide use.
- Analyze 100 items in 10 seconds.

Creator of Effective Tools for Effective Management

Phone Westport, Conn. CA 7-4111 or write

WASSELL ORGANIZATION, INC.

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CITY_____ STATE_____

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For more data, circle No. 42 on back cover card

Now a faster reading DIAL CALIPER

● A newly designed caliper for easier, faster, more accurate measurement. ● Deeply engraved quarter inch beam graduations simplify reading. ● Knife jaws permit inside measurements starting at zero as well as easy outside and depth measurements—can be locked in position. ● All operating components are completely enclosed. ● Precision built entirely from stainless steel and brass for continued accuracy and dependability. ● Twomodels available—6" at $39.00, 8" at $42.00.

WRITE TODAY FOR FREE LITERATURE—Dealer Inquiries are Invited

TITAN TOOL SUPPLY CO. Box N, 1419 Hertel Avenue, Buffalo 16, N. Y.

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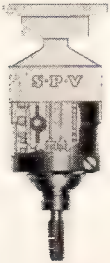
S.P.V. TAPPING ATTACHMENT



An axially floating spindle with the tap itself as lead screw. Quick change of taps for tapping different size holes in same work piece. No wasted time, no ruined threads. Sizes from #0 to 2 taps.

Call or write REPRESENTATIVES WANTED

Homestrand INCORPORATED

9 Addison St. Larchmont, N. Y.

SPV Tapping Attachments are guaranteed to produce the most threaded holes, to specified tolerances, per dollar spent.

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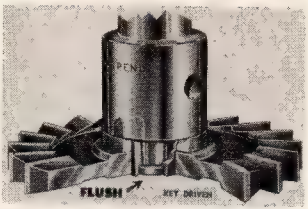
NEW FLUSH ARBOR WITH KEY-DRIVEN CUTTER



Flush arbor has no nut protruding below face of cutter. Cutter key driven. Permits side milling cutter to do face milling. With a side milling cutter does many shaper jobs faster and to closer tolerances. Allows a cutter to cut its full diameter across a flat surface. Perfect for milling dovetails. The arbor to use in grinding milling cutters. Fits more than thirty cutter sizes. For full details of Peterson FLUSH Arbor write

SIERRA MACHINE CO.
4th & Dwight Way
BERKELEY 10, CALIFORNIA

For data, circle No. 433 on cover

PRODUCT NEWS

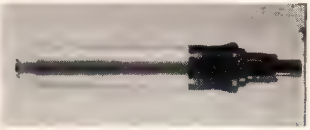
Get detailed information on these items by circling the NP Number on the back cover postal card.

MicroDex boring bars → add micro-adjustment to throw-away insert principle, for savings on boring jobs by eliminating tool grinding and resharpening, reducing downtime. Have rigid locking method, compact design. Data in catalog from Valenite Metals, Box 205, Royal **Oak**, Mich. Circle NP 1.

KDI die heads can be converted from either outside trip to inside trip by a few minor adjustments. On the larger sizes it is possible to provide reaming and chamfering tools at-

tached to end of inside trip. Available in seven sizes, 5/16" to 2½", from Geometric-Horton, New Haven 15, Conn. NP2.

Miniature air-operated screwdriver weighs only 8 oz, has automatic "on - off" control. Motor runs at 14,000 rpm. Used on No. 1 to No. 8 ANC and ANF screws and equivalent



nuts. Good for assembly of instruments, appliances, etc. For details, write Newage Industries, Inc., 222 York Rd., Jenkintown 17, Pa., or circle NP 3.

← Belt - driven wheelheads of interchangeable cartridge type develop 45,000-100,000 rpm spindle speeds. Good for grinding small diameter holes where surface speed of wheel is critical. Cartridge changeover simple. Details from Heald Machine Co., Worcester 6, Mass., or NP4.

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Rugged . . . lightweight . . . powerful . . . precision built for the toughest or touchiest jobs. You can rely on Dumore . . . industries most complete grinder line.

SERIES Super 10

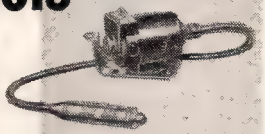
1/10 hp. ⅛" to ⅞" wheels. 22,000 rpm. Weighs under 3 lbs. Only $49.50, FOB Racine.

7 models—1/20 to ¼ hp. speeds up to 35,000 rpm. Priced from $37.50 up, FOB Racine.

and flex-shaft tools

POWER IN THE PALM OF YOUR HAND

Easy-to-handle . . . power-packed . . . versatile . . . speed cutting, polishing, routing, grinding, deburring and other hand operations. 4 models from 1/20 to ¼ hp—priced from $42.50 up, FOB Racine.



SUPER-FLEX Series 6

The finest you can buy. Takes all ¼" or ⅛" shank tools. ¼ hp, 22,000 rpm. Only $127.50, FOB Racine.

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Versa-Mil • Drill-N-Tap Units • Drilling Units • Drill Heads • Micro-Drills • Drill Grinders • Precision Grinders • Hand Grinders • Flex-Shaft Tools • Quills and Accessories

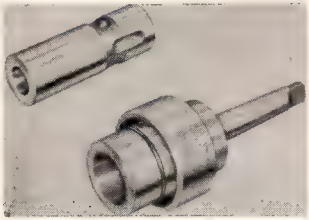
THE DUMORE COMPANY
1332 Seventeenth Street
Racine, Wisconsin

For more data, circle No. 45 on back cover card

Product News

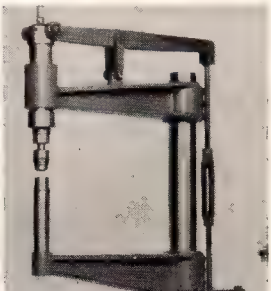
Low-Cost Drill Stop: The Wedgelock drill → stop regulates depth of drill hole, coil-spring cushions the breakthrough, prevents the chuck from marring work surfaces, reduces burr, and increases drill life by adding support. It's made of two steel end pieces connected by a spring. It's held on the drill by a set screw. Standard sizes fit drills from #50 to 5/16" diam. Get data from Wedgelock Corp., 5446 Satsuma Ave., N. Hollywood, Calif., or circle NP 5.

Quick-change tool, the Magic Chuck, requires only seconds to change tools. Ring quickly locks collet in chuck and provides positive drive for it through two balls held in the collet recesses by the ring. Chucks made in five sizes, ASA or Morse taper, with holes to accommodate collets having 11/16" to 2⅜" OD. Get full specs and prices from Seibert & Sons, Inc., Chenoa, Ill., or circle NP 6.

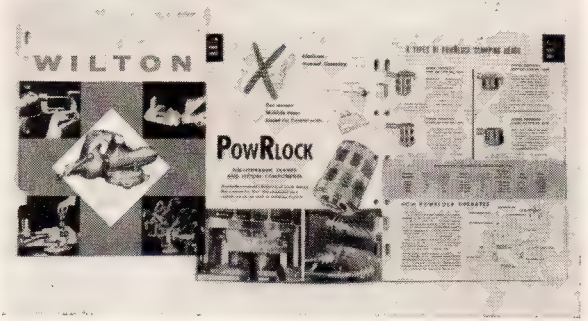


A rubberized abrasive introductory kit has been assembled by Cratex Mfg. Co., 1600 Rollins Rd., Burlingame, Calif. It contains 80 commonly used wheels and points in four grit textures, and four mandrels for ⅛" chuck. They're used for sensitive deburring, smoothing, and polishing. Get catalog from Cratex, or circle NP 7.

Pneumatic planishing hammer, → Model 200-RHP-18, planishes, forms, and assembles sheet metal parts. It's floor-mounted, has 18" throat clearance, and is foot-pedal operated, and has a 5/16" dia rivet capacity in mild steel. Descriptive literature is available by writing Heinrich-Nourse Co., 631 E. Third St., Los Angeles 13, Calif., or circling NP 8.



Exciting new best seller! Yours FREE!



Wilton's new "book" is more than a catalog! It's actually a production know-how manual that shows you in-plant photos and operating case histories of how Wilton clamping tools (both manual and powered) have been used by the best brains in the business to save production time and money. Of course we show our line, and that too is unique—**Wilton has the most complete line of clamping tools in the world.** Write for your copy now; it's an education that will pay dividends in your plant. No obligation, of course.

WILTON

WILTON TOOL MFG. CO., INC. / SCHILLER PARK, ILL.

M49

For more data, circle No. 47 on back cover card

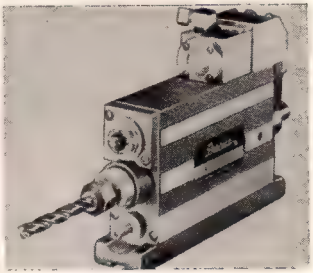
Product News

Sturdy, Sealed Spindle: New external → quill (spindle) introduced by The Dumore Co., Racine, Wis., is ideal for special workheads mounted on the Series 12 precision grinder or by itself held in a special fixture. Completely sealed against grit and moisture, it can be used at 8000 rpm for smooth operation, fine finishes. Quill can be operated in any position. Write to Dumore, or circle NP 9 for literature.

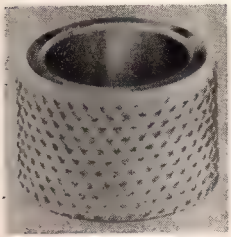
Wheel dressers, made of special powdered metal-diamond formulation, are primarily for internal grinding, to cut chatter in dressing small wheels. Also for final dressing where sharp

outside corners are to be held on larger wheels. Get data from Taro-Loid, Inc., 1321 S. Mateo St., Los Angeles 21, or circle NP 10.

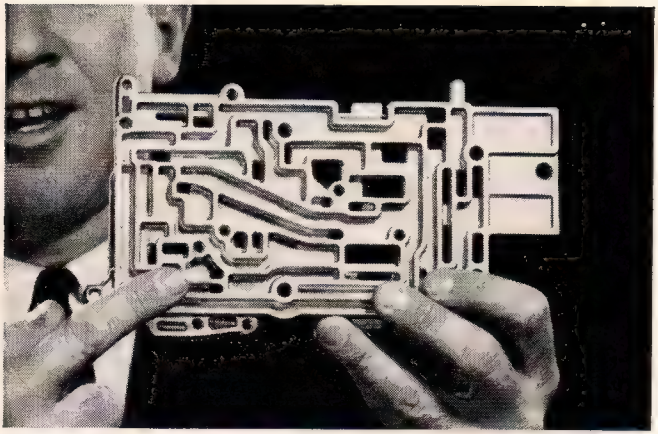
Small automatic drill, the Autodrill (2" x 12" x 7", not including motor), is air-hydraulic and mountable in horizontal or



vertical position on 2" centers. Get data from Precise Products Corp., Racine, Wis., or circle NP 11.



←**Ceramic Drill Bushings,** Ceram-A-Grip line for plastic tooling, have a thin shell of ceramic material fused onto the outer surface, creating a superior heat barrier that effectively insulates the plastic material from excess frictional heat buildup in the bushing. Guard against heat-caused bushing misalignment and spin out. Get literature from American Drill Bushing Co., 5107 Pacific Blvd., Los Angeles 58, or circle NP 12.



"TAP LIFE 40 TIMES GREATER WITH BESLY X-PRESS® TAPS!"

This aluminum die cast channel plate used to be tapped by a leading automotive transmission builder at an average of 1,000 to 1,500 holes per tap. Downtime was excessive. Then, Besly X-Press Taps were tried. They averaged 59,450 holes per tap . . . a 40-1 increase in tool life. Tap breakage, costs, and downtime were reduced substantially.

BESLY®

Call your Besly distributor or write today for new bulletin

BESLY-WELLES CORPORATION
126 Dearborn Ave., South Beloit, Illinois

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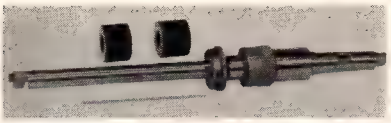
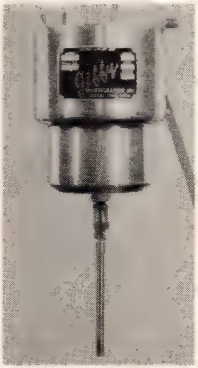
Product News

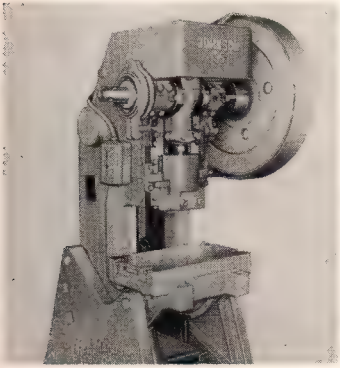


Fully-automatic deep-hole recessing can now be done accurately without a supporting jig with Maxwell Industries' new JS-type recessing tool. Used with any number of nose piece extensions to fit the part being machined, it is supported rigidly at the point of the work. It can be used on a variety of machine tools, with or without fixtures. Get details from Maxwell, 493 E. Fifth St., Ashtabula, Ohio, or circle NP 13.

New type metal disintegrating machine → has been developed by Jiffy Corp. for removing broken tools and also burning shaped holes into hardened metals, cutting keyways, etc. It works on electro-magnetic principle and has controlled drive and lift power. Get details from Jiffy, 1503 E. 11-Mile Rd., Royal Oak, Mich., or circle NP14.



A rust-preventing solvent for industrial machines and metals is now available from Frank A. Hoppe, Inc., long-time maker of gun cleaning solvents. The new solvent is easily applied and removes and prevents rust, and cleans dirt from surfaces. Get details from Hoppe, 2314 N. Eighth St., Philadelphia 33, or circle NP 15.



← **This 35-ton OBI** press is now in Johnson Machine & Press Corp.'s line. It has one-piece high tensile cast iron frame, is available in conventional flywheel or back-geared styles, with Johnson pin clutch or Witchita air friction clutch. Main bearing caps are split on a 30° angle to allow the frame to absorb the shock load. Crank strokes range from 2½" to 6". Get specifications from Johnson Press Machine & Press Corp., Elkhart, Ind., or circle NP 16.

ANNOUNCING

The new **CRATEX**

TOOL & DIE MAKERS KIT

The world's finest rubberized abrasives for deburring, smoothing and polishing tools, dies, patterns, molds, models, instruments and component parts.

Kit contains 80 wheels and points in the most popular sizes and shapes, equally assorted in four grit textures, coarse (C), medium (M), fine (F), extra fine (XF)... plus four mandrels for ⅛" chuck... packaged in plastic box, compartmented for fast selection. $7.50 complete.

Order your new Cratex Tool & Die Makers Kit #777 through your distributor—or, send your order to us for delivery by the Cratex distributor nearest you.

CRATEX *Free 8-page catalog available on request.*

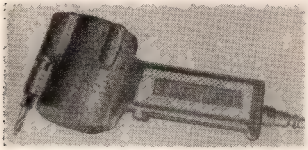
MANUFACTURING CO., INC.

1600 ROLLINS ROAD, BURLINGAME, CALIFORNIA

For more data, circle No. 51 on back cover card

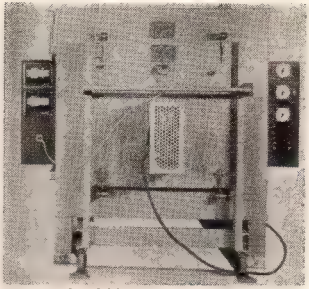
Product News

Hand drilling of holes within 9/32" radius in 90° corners and within ¼" of other obstructions is easily handled with the Spacemite drill motor. Ruggedly constructed for ¼" drills and suited for heavy applica-



tions, it will take overload to ½" reamers or drills. Air consumption is about 18 cfpm; spindle speed, 3000 rpm. Get detailed information from Winslow Product Engineering Corp., 47 St. Joseph St., Arcadia, Calif., or circle NP 17.

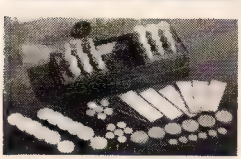
This electrically heated controlled atmosphere retort oven is for annealing without risk of oxidation or loss of expensive inert atmosphere. Working



space is 24" x 24" x 18" deep; max. temp., 1100°F. Get details from Grieve-Hendry Co., 1393 W. Carroll, Chicago 7, or circle NP 18.

Ticklish Finishing Job?

Do it better with a Paramount Felt Bob



See your jobber or write for literature

For tough polishing, buffing, lapping or deburring finishing problems where tolerances must be held close — put a Paramount Bob on the job. 7 shapes, 42 sizes, hardnesses from soft to rock hard. Ideal for such precision work as • **Die and mold making** • **Micro finishing** • **De-burring** • **Fine buffing.**

New Low Cost Bob Kits

K-1 Kit includes 24 assorted bobs, 36 small wheels, touch-up pads, packaged in convenient bench top box — only $10.95.

K-2 Kit similar but includes four sticks assorted polishing compounds — only $12.95. Order today and save over cost of buying bobs separately.

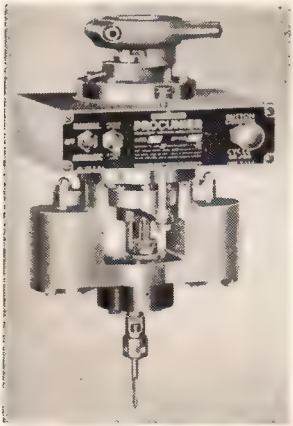
Bacon Felt Co.

467 West Water St., Taunton, Mass.

For more data, circle No. 52 on back cover card

NEW LOW COST LEAD SCREW TAPPER with PUSH BUTTON control.

The most accurate, most precise, cost-cutting tapper on the market! New, different, flexible, it can be operated with push button and foot control for cycle or jog, automatic or with switch in fixture for full cycle. Either way, it provides a UNIFORMITY, SPEED and PRECISION ACCURACY that's unparalleled! EASY TO OPERATE—PAYS FOR ITSELF!



Produces Gauge Perfect Parts; Eliminates Parts Spoilage, Inspection; Saves Taps, Reduces Fixture Costs; Fast, Economical, 6-way Operating Action; Write for FREE Brochure for complete details! PROCUNIER SAFETY CHUCK COMPANY, 14-16 South Clinton Street, Chicago, Illinois, Dept. 4.

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LITERATURE

Twenty-eight pages of socket screw products, including many recently introduced items, make up Set Screw & Mfg. Co.'s new Catalog #23. Circle L-1 for your copy.

Ideas on how to improve milling and boring operations are in Ingersoll Milling Machine Co.'s "Winning Combinations that Reduce the Cost of Chips." This is not a catalog, but a handy reference. Get a copy, circle L-2 on the cover.

A new cold work alloy tool and die steel, Lo-Air, is described in Universal-Cyclops Steel Corp.'s new bulletin. It includes data on machining, heat treatment, mechanical properties, etc. Circle L-3, for your copy.

The "Rust Inhibitor Paper Manual" contains the why, when, where, what, and who concerning inhibitor papers and their use against rust. Get your copy of Orchard Paper Co.'s bulletin, circle L-4.

A new line of off-the-shelf high temperature ceramic tool components is described in Duramic Products' Bulletin 116. Circle L-5.

Ninth Edition of Hi-Shear Tool Co.'s tool catalog is now available. Many new fasteners and tools are included that are especially for stainless steel and harder materials. Get a copy, circle L-6.

Thinwall Drill Jig bushings, made by American Drill Bushing Co., are described and priced in a new folder. Get a copy, circle L-7.

Useful, Informative Full of Metal Facts

Thousands of fasteners of all types are in Abbott Screw & Mfg. Co.'s new 32-page catalog. Get a copy of Catalog 107, circle L-8.

Seventy full-size tracing templates of basic fixtures and fixture parts are in the jumbo new catalog from Standard Parts Co. For a copy, circle L-9.

Data on barrel finishing machines and medias is concisely presented in Catalog B-25-C from Almco, Queen Products Div'n. Circle L-10 for a copy.

Air - operated diaphragm chucks are described in the newest bulletin from Erickson Tool Co. Circle L-11 for a copy.

"How to order grinding wheels" is just one section of the latest catalog from The American Emery Wheel Works. Circle L-12 for a copy.

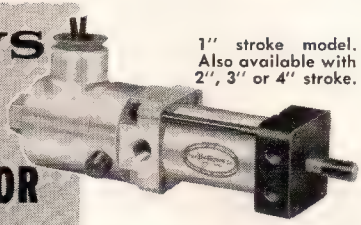
"Good man, Feasby! Once he sits down to work he never gets up til quitting time."

LOW COST SOLUTION TO A THOUSAND PRODUCTION PROBLEMS...

Bellows

CONTROLLED-AIR-POWERED

HAN-D-MOTOR



1" stroke model. Also available with 2", 3" or 4" stroke.

CLAMPING
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The cost-cutting applications of the rugged little Han-D-Motor are limited only by man's ingenuity.

Consisting of an air cylinder with integrally-mounted solenoid valve, the Han-D-Motor is a complete work unit which mounts in any position, can be controlled by switches, relays, timers and similar electrical devices, provides thrust approximately equal to air line pressure, can be synchronized with any related operation.

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Get complete information on Bellows Han-D-Motors and how they can cut costs in your plant. 1312-B

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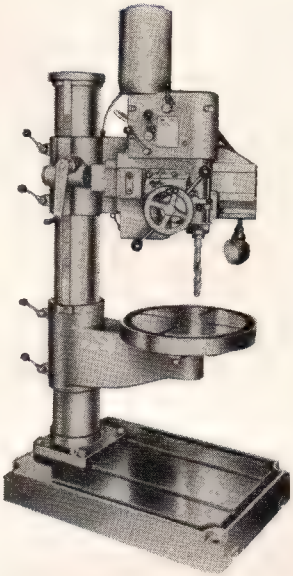

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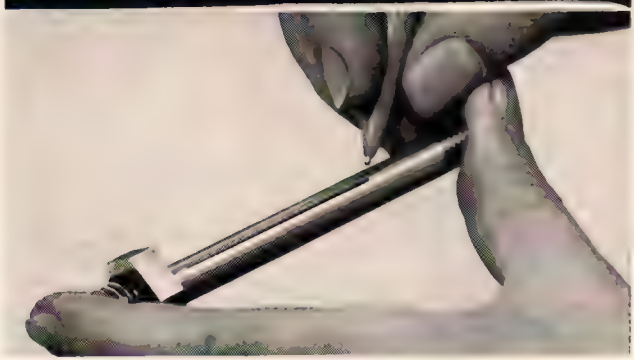

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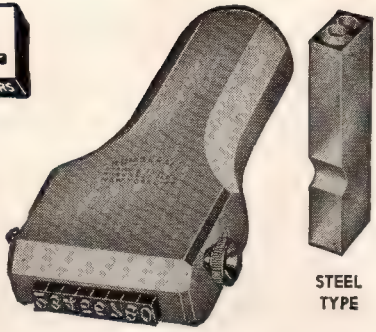

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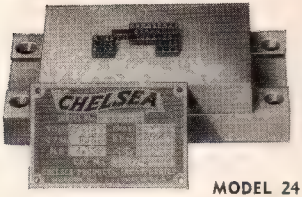

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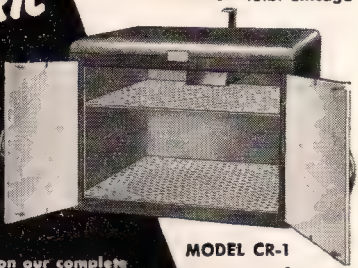

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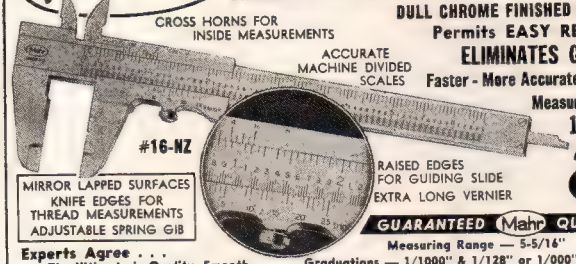

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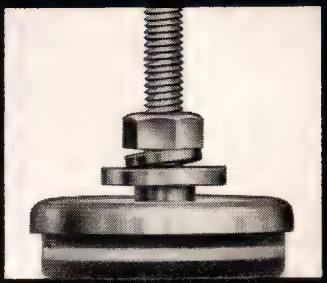

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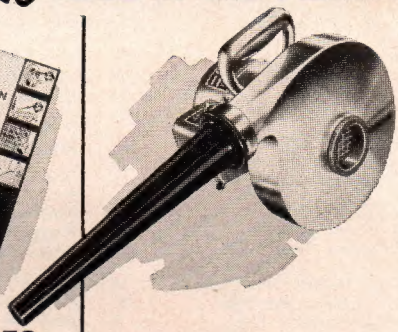

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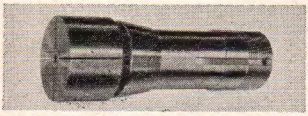

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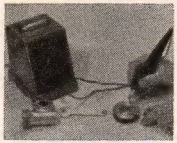

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